IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: KIM, Kyeong Jin	Customer No.: 30827
Application No.: 10/015701	Confirmation No.: 6382
Filed: December 17, 2001	Art Unit: 2871
For: METHOD FOR MANUFACTURING LIQUID CRYSTAL DISPLAY DEVICE	Examiner: Rude, Timothy L.

Mail Stop Appeal Brief - Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Sir:

In response to the Examiner's Answer mailed September 17, 2010, Appellants hereby submit this Reply Brief.

TABLE OF CONTENTS

The brief contains items under the following headings as required by 37 C.F.R. § 41.37 (c) and 41.41 and M.P.E.P. § 1208:

I. STATUS OF CLAIMS

Total Number of Claims in the Application.

There are 30 claims pending in this application.

Current Status of Claims:

Claims canceled:	2, 3, 10, 11, 20 and 29	
Claims withdrawn from consideration but not canceled:		6, 8, 16 and 21-28
Claims pending:	1, 4-9, 12-16, 17-19 and 21-28	
Claims allowable:	None	
Claims rejected:	1, 4, 5, 7, 9, 12-15 and 17-19	
Claims on appeal:	1, 4, 5, 7, 9, 12-15 and 17-19	

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether the rejection of claims 1, 4, 5, 7, 9 and 11-14 is proper under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,130,729 issued to Oh *et al.* (hereafter "Oh") in view of U.S. Patent No. 6,573,965 issued to Liu *et al.* (hereafter "Liu"), U.S. Patent No. 6,055,035 issued to Von Gutfield *et al.* (hereafter "Von Gutfield"), U.S. Patent No. 6,515,718 issued to Kishimoto *et al.* (hereafter "Kishimoto"), U.S. Patent No. 7,224,421 issued to Takeda *et al.* (hereafter "Takeda"), U.S. Patent No. 5,907,380 issued to Lien, U.S. Patent No. 5,511,591 issued to Abe, U.S. Publication No. 2001/0004281 issued to Sasaki further in view of U.S. Patent No. 7,136,140 issued to Inoue *et al.* (hereafter "Inoue").

(2) Whether the rejection of claim 15 is proper under 35 U.S.C. § 103(a) as being unpatentable over Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue as applied to claims 1, 4, 5, 7, 9 and 11-14 and further in view of U.S. Patent No. 6,603,528 to Tanaka *et al.* (hereafter "Tanaka").

(3) Whether the rejection of claims 17-19 is proper under 35 U.S.C. § 103(a) as being unpatentable over Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue as applied to claims 1, 4, 5, 7, 9 and 11-14 and in view of U.S. Patent No. 6,100,953 to Kim *et al.* (hereafter "Kim").

III. ARGUMENT

A. Arguments in Reply to Section (9) of the Examiner's Answer

The Grounds of Rejection set forth in the Examiner's Answer are substantially similar to those set forth in the final Office Action, mailed January 6, 2010. Accordingly, Appellant maintains its Arguments, as set forth in the Appellant's Appeal Brief filed on July 1, 2010.

B. Arguments in Reply to Section (10) of the Examiner's Answer

Hereinbelow, Appellant replies to the Examiner's responses to Appellant's arguments as set forth in the Examiner's Answer, mailed September 17, 2010.

In the Appeal Brief at pages 9-11, the Appellant presented that the combination of Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue does not teach or suggest the features of "forming a dielectric frame having a first height and a sealant structure having a second height on a second substrate, the dielectric frame including a material having a small dielectric constant, the material including photoacrylate; dispensing a plurality of droplets of liquid crystal on the first substrate having no dielectric frame so that the plurality of droplets of liquid crystal on the first substrate are spaced with each other; attaching the first and second substrates to each other for forming the LCD panel" recited in claim 1.

In the Examiner's Answer at pages 22-24, the Examiner appears to admit that none of the cited references discloses the aforementioned features of claim 1. However, the Examiner asserts that "there are few possible species of liquid crystal dropping method as it pertains to dropping liquid crystal onto a substrate with or without a dielectric frame; there are only two possibilities, both will work although one may work better than the other, so both are rendered obvious…" The Examiner summarizes the aforementioned features of claim 1 as dropping liquid crystal onto a substrate without a dielectric frame, and then concludes that such a dropping method is obvious.

As discussed in the Appeal Brief, a sealant and a dielectric frame used for multi-domain effects in the claimed invention are formed on the same second substrate with a specific height difference (i.e., more than 1 μm) and liquid crystal is dispensed on the first substrate where a thin film transistor and a pixel electrode are formed, without a dielectric frame. By doing so, an LCD panel can be manufactured in a shorter period of time. Also, the specific height difference between the sealant and the dielectric frame allows the liquid crystal dispensed on the first substrate to be uniformly distributed and generation of bubbles are minimized or prevented during the manufacturing process, especially when the first and second substrates are attached together. Because the Examiner's abstraction ignores all words in the aforementioned features as well as the interactions with the other limitations of claim 1, this reasoning should be rejected by the Board. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). See MPEP § 2143.03.

It is also worth noting that, as discussed in the Appeal Brief, none of the cited references including Oh, Liu, Von Gutfield and Inoue recognizes the problems that the dielectric frames formed on both substrates slow down the movement and uniform distribution of the liquid crystal provided between the two substrates, thereby increasing the time required for manufacturing an LCD panel, and that bubbles in the dispensed liquid crystal may be generated without an appropriate height relationship between the dielectric frame and the sealant. A patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. See MPEP § 2141.

In the Appeal Brief at pages 9-11, the Appellant presented that the combination of Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue does not teach or suggest

the features of "wherein the second height of the sealant structure is higher than the first height of the dielectric frame, a height difference between the first height and the second height is more than 1 μm so that the height difference between the sealant structure and dielectric frame prevent generation of bubble in liquid crystal, allows the dispensed liquid crystal to be uniformly distributed and not to hinder the dispensed liquid crystal from being moved and uniformly distributed between the first substrate and the second substrate, wherein the first height the dielectric frame is a range of 1-2 μm and the second height of the sealant structure is in a range of 5-8 μm" recited in claim 1.

In the Examiner's Answer at pages 24-31, the Examiner first asserts that "probably no prior art uses a sealant height that is NOT more than 1 μm greater than the dielectric frame height. All prior art found had sealant heights that are understood to be substantially taller than the dielectric frame height based upon Figures and associate text." As discussed in the Appeal Brief, none of the cited references discloses the aforementioned features of claim 1. The Examiner's personal characterization of prior art without pointing out specific disclosures should be rejected by the Board. The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reasons why the claimed invention would have been obvious. The Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit. See MPEP § 2142.

The Examiner then asserts that "Takeda teaches a cell thickness of 3.5 μm [which sets the needed sealant height that must traverse the cell gap in order to seal in the liquid] and Takeda teaches protrusions [dielectric frames] of 1.5 μm, so 3.5 – 1.5 is greater than 1." As discussed in the Appeal Brief, Figs. 19 and 100A in Takeda show protrusions formed on both substrates different from the claimed invention. Assuming *arguendo* that the protrusions 20A and 20B in Fig. 19 of Takeda are formed only on one of the substrates, the height of the

combined protrusions would then become 3 μm (i.e., 1.5 μm + 1.5 μm) with a cell thickness of 3.5 μm, and one of ordinary skill in the art would understand that the height difference between the sealant and the dielectric frame would then become about 0.5 μm, which thus obviates the claimed range of the height difference (i.e., more than 1 μm). Accordingly, the Appellant respectfully disagree with the Examiner's characterization of the Takeda reference.

The Examiner also asserts that "it is noted that the features upon which applicant relies (i.e., qualitative argument as to the time required for the liquid crystal to spread out over the substrate) are not recited in the rejected claim(s)." However, claim 1 is rejected under 35 U.S.C. § 103 over various references including Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue. The question of obviousness must be resolved on the basis of factual determinations such as ascertaining the differences between the claimed invention and the prior art. See MPEP § 2141. As discussed in the Appeal Brief, because the protrusions in Figs. 19 and 100A of Takeda are formed on both substrates, the liquid crystal dispensed on one of the substrates as allegedly taught by Von Gutfield would not move fast and uniformly be distributed when the two substrates are attached to each other as compared with the claimed invention, which would counteract reducing the time required for manufacturing an LCD panel, one of the principles of the present invention. Accordingly, the Appellant respectfully submits that it would not have been obvious to one of ordinary skill in the art to combine the cited references and arrive at the claimed invention with any reasonable expectation of success. In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP § 2141.02.

The Examiner further asserts that "Regarding bubbles, no production displays may have bubbles. All the applied references avoid bubble formation in order to produce displays of satisfactory display quality..." Again, it is respectfully pointed out that claim 1 is rejected under 35 U.S.C. § 103 over various references including Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue. The Examiner gleans various elements from various prior art, allegedly reconstructs the claimed invention, and assumes that the reconstructed device would not have any bubble problems. As discussed in the Appeal Brief, Table I of the instant application clearly shows that the inventor performed a series of experiments with different heights of the sealant and the dielectric frame to discover that when the height difference is more than 1m, generation of bubbles in the dispensed liquid crystal is minimized or prevented and the dispensed liquid crystal is moved and uniformly distributed between the two substrates during the manufacturing process. Thus, the Examiner's assumption should not be warranted in the reconstructed device and this reasoning should be rejected by the Board.

The Examiner also asserts that "Lastly, a liquid will spread out due to gravity. Applicant has not claimed anything that is not rendered obvious..." This assertion appears to be responsive to the Appellant's argument that because one of the principles of the claimed invention is to reduce the time required for manufacturing an LCD panel, it is irrelevant in determining the patentability of the claimed invention whether or not liquid crystal ultimately moves to become a uniform layer in a completed LCD device. Again, the Examiner ignores all words in the aforementioned features of claim 1 in that the claimed height difference allows the dispensed liquid crystal to be uniformly distributed and not to hinder the dispensed liquid crystal from being moved and uniformly distributed between the first substrate and the second substrate, which reduces the time required for manufacturing an LCD panel.

Finally, with respect to the Kishimoto reference, the Examiner asserts that "a results [sic] variable is sufficient to render obvious the setting of the height of the dielectric frames to a height that will meet appellant's claimed height difference." In the final Office Action at page 9, the Examiner alleged that "Kishimoto discloses the motivation to optimize the height of a dielectric structure is to account for the relative dielectric constants of the respective components (col. 18, lines 21-23). In other words, the height is made sufficient to achieve the desired dielectric effect given the relative dielectric strength of the material used." As discussed in the Appeal Brief, the Kishimoto reference does not disclose the claimed height difference. Nor does Kishmoto recognize the problems that the dielectric frames formed on both substrates slow down the movement and uniform distribution of the liquid crystal provided between the two substrates, thereby increasing the time required for manufacturing an LCD panel, and that bubbles in the dispensed liquid crystal may be generated without an appropriate height relationship between the dielectric frame and the sealant. It is also noted that the claimed height difference is not merely an outcome of optimization as alleged by the Examiner. Table I of the instant application shows that the inventor performed a series of experiments with different heights of the sealant and the dielectric frame to discover that when the height difference is more than 1m, generation of bubbles in the dispensed liquid crystal is minimized or prevented and the dispensed liquid crystal is moved and uniformly distributed between the two substrates during the manufacturing process.

With respect to the rejections of the dependent claims (claims 15 and 17-19), the Appellant maintains its Arguments, as set forth in the Appellant's Appeal Brief filed on July 1, 2010.

IV. CONCLUSION

For all of the above reasons, Appellants respectfully request that this Honorable Board finds as follows:

(1) The rejection of claims 1, 4, 5, 7, 9 and 11-14 under 35 U.S.C. § 103(a) as being unpatentable over Oh, in view of Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, and Sasaki further in view of Inoue is improper and should be reversed.

(2) The rejection of claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue as applied to claims 1, 4, 5, 7, 9 and 11-14 and further in view of to Tanaka *et al.* is improper and should be reversed.

(3) The rejection of claims 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Oh, Liu, Von Gutfield, Kishimoto, Takeda, Lien, Abe, Sasaki and Inoue as applied to claims 1, 4, 5, 7, 9 and 11-14 and in view of Kim is improper and should be reversed.

The Office is hereby authorized to charge any fees, including the fees required under 37 C.F.R. § 1.17(f), any additional fees required under 37 C.F.R. §§ 1.16, 1.17, and/or 1.136, for any necessary extension of time, or any other fees required to complete the filing of this Appeal Brief, to Deposit Account No. 50-0911. Please credit any overpayment to Deposit Account No. 50-0911.

Dated: November 12, 2010

Respectfully submitted,

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